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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/018,759	03/29/2002	Gerhard Herbig	P/63035-PCT	2761

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EXAMINER

AHN, SAM K

ART UNIT	PAPER NUMBER
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2611

DATE MAILED: 08/23/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/018,759

Applicant(s)

HERBIG, GERHARD

Examiner

Sam K. Ahn

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 25 July 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 5-7 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 5 and 6 is/are rejected.
- 7) ☒ Claim(s) 7 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 18 December 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 07/25/06 has been entered.

Claim Objections

2. Claims 5-7 are objected to because of the following informalities:

In claim 5, line 6, "the detector" should be "the phase error detector", line 7, "detector being" should be "phase error detector being", line 8, "decision regions" should be "plurality of decision regions" and line 8, "zero-crossing points" should be "zero-crossing locking points".

In claim 6, line 2, "detector is" should be "phase error detector is".

In claim 7, line 5, "F1" should be "FI", line 9, "quadrature-phase" should be "quadrature". Appropriate correction is required.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims are rejected under 35 U.S.C. 103(a) as being unpatentable over Sari US 4,958,360 in view of MacDonald et al. US 5,504,453 (MacDonald, cited previously).

Regarding claim 5, Sari teaches a phase error detector (see 25 in Fig.4) for generating a phase correction signal (output of 30) to correct a phase difference between a reference frequency of a voltage-controlled oscillator (17, note col.1, line 11 and col.7, lines 25-26 wherein the oscillator 17 is a voltage-controlled oscillator) and a carrier frequency of a received signal (5, note col.1, lines 59-61, the phase comparator or phase error detector 25 of Sari determines the phase error $\epsilon(\phi)$, note col.7, lines 25-26, to correct the phase difference) which is received by a quadrature-amplitude modulated (QAM) receiver (note col.2, lines 37-38, 16-QAM modulation), the phase correction signal having a zero-crossing locking point (wherein zero-crossings are eliminated, note col.2, lines 13-14 and col.4, lines 10-14, and phase error becomes zero, note col.3, lines 41-42, hence Sari teaches eliminating zero-crossings and phase error approaching zero to lock the incoming signal 5 during the phase error detection by 25), the received signal having in-phase components and quadrature components (10 and 20 in Fig.4, note col.6, lines 53-54) in a plurality of decision regions (see Figs.1-3 wherein Sari teaches plurality of decision regions by different shades, example of three decision regions given by Sari, note col.5, lines 66-68), and Sari further teaches wherein the phase error detector operative until the phase correction signal

having no additional zero-crossing locking points is generated (note col.3, lines 41-42 wherein the zero-crossing locking points generated as described previously becomes zero, hence, one skilled in the art would recognize that phase error and zero-crossings are eliminated and thus properly recover the incoming signal 5).

However, Sari does not explicitly teach the phase error detector comprising a plurality of different algorithms arranged in an order, and the phase error detector being operative for successively executing the algorithms in the order, for each of the plurality of decision regions.

MacDonald teaches a phase error detector (10 in Fig.1) receiving in-phase and quadrature components (I and Q) comprising a plurality of different algorithms arranged in an order and the phase error detector being operative for successively executing the algorithms in the order (different algorithms, note col.4, line 47 - col.5, line 64, wherein for each region when $S=S_0, S_1 \dots$ or S_7 different algorithms are executed in the order from S_0 through S_7), for each of the plurality of decision regions ($S_0 \sim S_7$).

Thus, by incorporating the algorithms in the order by the look-up table (16 in Fig.1) of MacDonald in the memory (26) in the phase error detector of Sari (25 in Fig.4), minimum amount of memory is used without sacrificing phase error estimate accuracy, as taught by MacDonald (note col.3, line 41-44). One skilled in the art would recognize that it is desirable to reduce overall cost of any system by using smaller memory, since overall production cost would be reduced.

Therefore, it would have been obvious to one skilled in the art at the time of the invention to incorporate the algorithms in the order by the look-up table (16 in Fig.1) of MacDonald in the memory (26) in the phase error detector of Sari (25 in Fig.4) for the purpose of reducing size of the memory (26 of Sari) without sacrificing phase error estimate accuracy, as taught by MacDonald (note col.3, line 41-44), thus reduce overall cost of the system by using memory with smaller size.

Regarding claim 6, MacDonald further teaches wherein the phase error detector is operative for executing different ones of the plurality of algorithms for all of the plurality of decision regions (see Figs.2 and 3 wherein for all of the plurality of decision regions S0 – S7, different algorithms are executed, note the algorithms in col.4, line 48 – col.5, line 64).

Allowable Subject Matter

4. Claim 7 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims, and overcome the claim objections.
5. The following is a statement of reasons for the indication of allowable subject matter:
Present application discloses a phase error detector correcting a phase error between a received signal and locally generated signal and generate a phase correction signal. Prior art teaches or suggests in combination of all the limitations

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claimed. However, prior art does not teach or suggest in combination of the limitation of executing the algorithm by the phase error detector in the order of $S1 = FQ f(ZI) - FI f(ZQ)$, $S2 = \pm 2 FQ f(ZI)$, $S3 = \pm 2 FI f(ZQ)$, $S4 = \pm 2 ZI ZQ$ and $S5 = 0$, wherein the definition of the variables are recited in the claim.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sam Ahn whose telephone number is (571) 272-3044. The examiner can normally be reached on Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mohammad Ghayour can be reached on (571) 272-3021. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Sam K. Ahn
Patent Examiner

8/15/06